ECM007

3V TRI-BAND GSM POWER AMPLIFIER MODULE

Features

- 3.5V Single Supply Operation
- 50 Ohms internally input and output matched
- High Efficiency EGSM=55%, DCS= 50%
- Small size
- On Board band select and output power control
- GPRS capable (Class 8, 10 and 12, 4 TX slots max.)

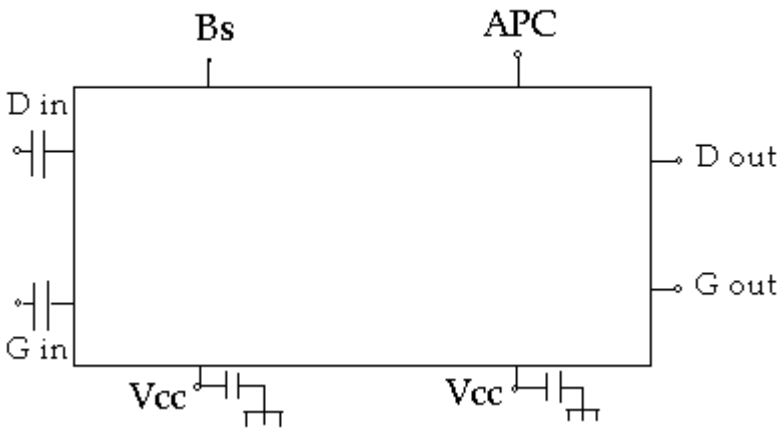
Applications

- Class 4 EGSM900 and
- Class 1 DCS1800 Cellular Handsets
- Dualband/Triband
- GPRS Class 8, 10 and 12

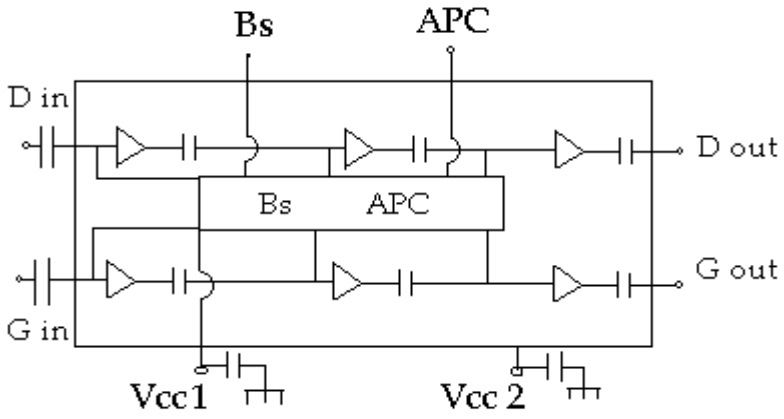
Description

The ECM007 is a tri-band EGSM/GPRS power amplifier module which is built on EiC's proprietary InGaP Heterojunction Bipolar Transistor (HBT) PA MMICs. The fully integrated PAM incorporates a band select switch and analog power control, and is input and outpout matched to 50 Ohm.

Application Diagram



Functional Block Diagram



CAUTION!
SENSITIVE ELECTRONIC DEVICE

ELECTRICAL SPECIFICATIONS

The following tables list the electrical characteristics of the ECM007 Power Amplifier Module.

Table 1 lists the electrical performance of the ECM007 for nominal operating conditions for the cellular GSM (880-915MHz) band.

Table 2 lists the electrical performance of the ECM007 for nominal operating conditions for the DCS (1710-1785MHz) band.

Table 3 lists the electrical performance of the ECM007 for nominal operation conditions for the PCS (1850-1910MHz) band.

Table 1 - Electrical specifications (1 of 3)

Test Conditions: Ta = 25°C, V_{CC} = +3.5 V, Pulse Width 1154 us, Duty Cycle 25%, 50 Ohm System
GSM Modulation, time slot 0~1:ON, 2~7:OFF

SYMBOL	PARAMETER	LIMITS			UNIT	TEST CONDITION
		MIN.	TYP.	MAX.		
F	Frequency - GSM 900	880		915	MHz	
Pin	Input Power - GSM 900		6		dBm	
Pout	Output Power - GSM 900		35.0		dBm	Note 1
PAE	Power Added Efficiency - GSM 900		55		%	Note 1
IRL	Input Return Loss (50 Ohm)		10		dB	
	Output Load Impedance		50		ohms	
	Forward Isolation		-34		dBm	Note 3
Pnoise	Output Noise Power (935 - 960MHz)		-82		dBm	Note 4
	Harmonics (2fo to 7fo)			-30	dBc	
	Leakage Current		10		uA	Note 2
Vapc	Control Voltage	0.2		2.8	V	
Ipc	Power Control Current		4		mA	
	Power Control Range		70		dB	Vapc = 0.2 to 2.6V
VSWR	Ruggedness Class 12	8:1				Pin=min to max all phases
	Rise fall time Po= -10 to 34.5dBm		10		µs	
	Rise fall time Po= -10 to +20dBm		3		µs	
	Rise fall time Po= -10 to 0dBm		1		µs	
	Band Select					
Vbs	GSM 900	0.0		0.5	V	
Vbs	DCS 1800/PCS 1900	2.0			V	
Vcc	Supply Voltage	2.9	3.5		V	
Note 1: Vcc = 3.5V, Vapc = 2.5V						
Note 2: Vcc = 4.5V, Vapc = 0V, Vbs = 0V						
Note 3: Vapcgsm=.2V, Pin=+10dBm						
Note 4: RBW=100KHz 935MHz to 960MHz Pout=35dBm Vcc=3.5V Pin=+6dBm						

ELECTRICAL SPECIFICATIONS

Table 2 lists the electrical performance of the ECM007 for nominal operating conditions for the DCS 1800MHz band.

Table 2 - Electrical specifications (2 of 3)

Test Conditions: Ta = 25°C, V_{CC} = +3.5 V, Pulse Width 1154 us, Duty Cycle 25%, 50 Ohm System
GSM Modulation, time slot 0~1:ON, 2~7:OFF

SYMBOL	PARAMETER	LIMITS			UNIT	TEST CONDITION
		MIN.	TYP.	MAX.		
F	Frequency - DCS 1800	1710		1785	MHz	
Pin	Input Power - DCS 1800		6		dBm	
Pout	Output Power - DCS 1800		32.0		dBm	Note 1
PAE	Power Added Efficiency - DCS 1800		50		%	Note 1
IRL	Input Return Loss (50 Ohm)		10		dB	
	Output Load Impedance		50		ohms	
	Forward Isolation		-34		dBm	Note 3
Pnoise	Output Noise Power		-82		dBm	Note 4
	Harmonics (2fo to 7fo)			-40	dBc	
	Leakage Current		10		uA	Note 2
Vapc	Control Voltage	0.2		2.8	V	
Ipc	Power Control Current		4		mA	
	Power Control Range		70		dB	Vapc= 2 to 2.6V
VSWR	Ruggedness Class 12	8:1				Pin=min to max all phases
	Rise fall time Po= -10 to +31.5dBm		11		µs	
	Rise fall time Po= -10 to +15dBm		5		µs	
	Rise fall time Po= -10 to 0dBm		1		µs	
	Band Select					
Vbs	GSM 900	0.0		0.5	V	
Vbs	DCS 1800/ PCS 1900	2.0			V	
Vcc	Supply Voltage	2.9	3.5		V	
Note 1: Vcc = 3.5V, Vapc = 2.5V						
Note 2: Vcc = 4.5V, Vapc = 0V, Vbs = 0V						
Note 3: Vapc=.2V, Pin=+10dBm						
Note 5: RBW=100KHz 1805MHz to 1880MHz Pout=32dBm Vcc=3.5V Pin=+6dBm						

ELECTRICAL SPECIFICATIONS

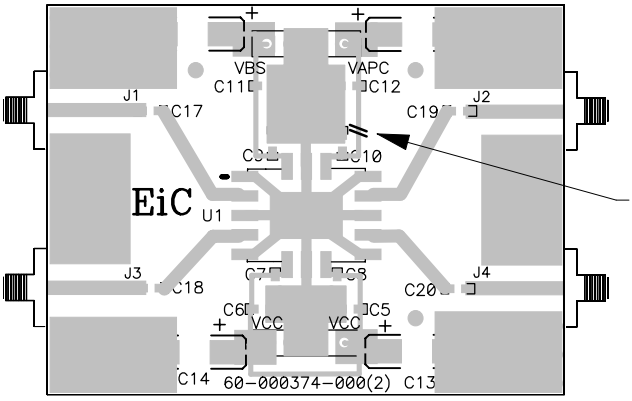
Table 3 lists the electrical performance of the ECM007 for nominal operating conditions for the PCS 1900MHz band.

Table 3 Electrical specifications (3 of 3)

Test Conditions: Ta = 25°C, V_{CC} = +3.5 V, Pulse Width 1154 us, Duty Cycle 25%, 50 Ohm System
GSM Modulation, time slot 0~1:ON, 2~7:OFF

SYMBOL	PARAMETER	LIMITS			UNIT	TEST CONDITION
		MIN.	TYP.	MAX.		
F	Frequency - PCS -1900	1850		1910	MHz	
Pin	Input Power - PCS 1900		6		dBm	
Pout	Output Power - PCS 1900		31.5		dBm	Note 1
PAE	Power Added Efficiency - PCS 1900		50		%	Note 1
IRL	Input Return Loss (50 Ohm)		10		dB	
	Output Load Impedance		50		ohms	
	Forward Isolation		-34		dBm	Note 3
Pnoise	Output Noise Power		-80		dBm	Note 4
	Harmonics (2fo to 7fo)			-35	dBc	
	Leakage Current		10		uA	Note 2
Vapc	Control Voltage	0.2		2.8	V	
Ipc	Power Control Current		4		mA	
	Power Control Range		70		dB	Vapc = 2 to 2.6V
VSWR	Ruggedness Class 12	8:1				Pin=min to max all phases
	Rise fall time Po= -10 to +31.5dBm		10		µs	
	Rise fall time Po= -10 to +15dBm		3		µs	
	Rise fall time Po= -10 to 0dBm		1		µs	
	Band Select					
Vbs	GSM 900	0.0		0.5	V	
Vbs	DCS 1800/PCS 1900	2.0			V	
Vcc	Supply Voltage	2.9	3.5		V	
Note 1: Vcc = 3.5V, Vapc = 2.5V						
Note 2: Vcc = 4.5V, Vapc = 0V, Vbs = 0V						
Note 3: Vapc=.2V, Pin=+10dBm						
Note 4: RBW=100KHz 1930MHz to 1990MHz Pout=31.5dBm Vcc=3.5V Pin=+6dBm						

EVAL BOARD



CUT TRACE WHERE INDICATED.
BRIDGE THE CUT IN THE TRACE
BY MOUNTING L1 ACROSS THE CUT

PCB LAYOUT

1. The front side of the pcb ground area under the PAM requires the use of multiple vias to provide low thermal resistance to the backside of the pcb ground.

QTY	REF.DESIG.	VALUE	DESCRIPTION	MFG & MFG P/N	
3	C7-9	1000 pF	CAPACITOR 0603	ROHM MCH185C5102KK	NOTE 1
2	C17,19	18 pF	CAPACITOR 0603	ROHM MCH185A180JK	NOTE 1
2	C18,20	33 pF	CAPACITOR 0603	ROHM MCH185A330JK	NOTE 1
1	C13	10 uF	CAP 6032 TANT 16V	PANASONIC ECS-HICC106R	NOTE 1
1	C12	0.01 uF	CAPACITOR 0603	ROHM MCH182C103KK	NOTE 1
3	C5,6,11	0.1 uF	CAPACITOR 0603	ROHM MCH182F104ZK	NOTE 1
1	L1	22 nH	INDUCTOR	TOKO LL1608-F22NK	NOTE 1
2	J5,J6	---	CONN, RT ANGLE	SULLINS ELEC PZCO4SGAN	
4	J1-J4	---	CONN, SMA	CDI 5260CC	
1	U1	---	IC, ECM007	EiC CORP ECM007	
1	PCB	---	PCB	EiC CORP 60-000374-000	
1	---	---	HEATSINK	EiC CORP MD-000374-000	

2. COMPONENTS NOT LOADED: C14, C15, C16

1. EiC RECOMMENDED COMPONENTS ARE SHOWN EQUIVALENT COMPONENTS MAY BE USED.

NOTE UNLESS OTHERWISE SPECIFIED

Figure 1

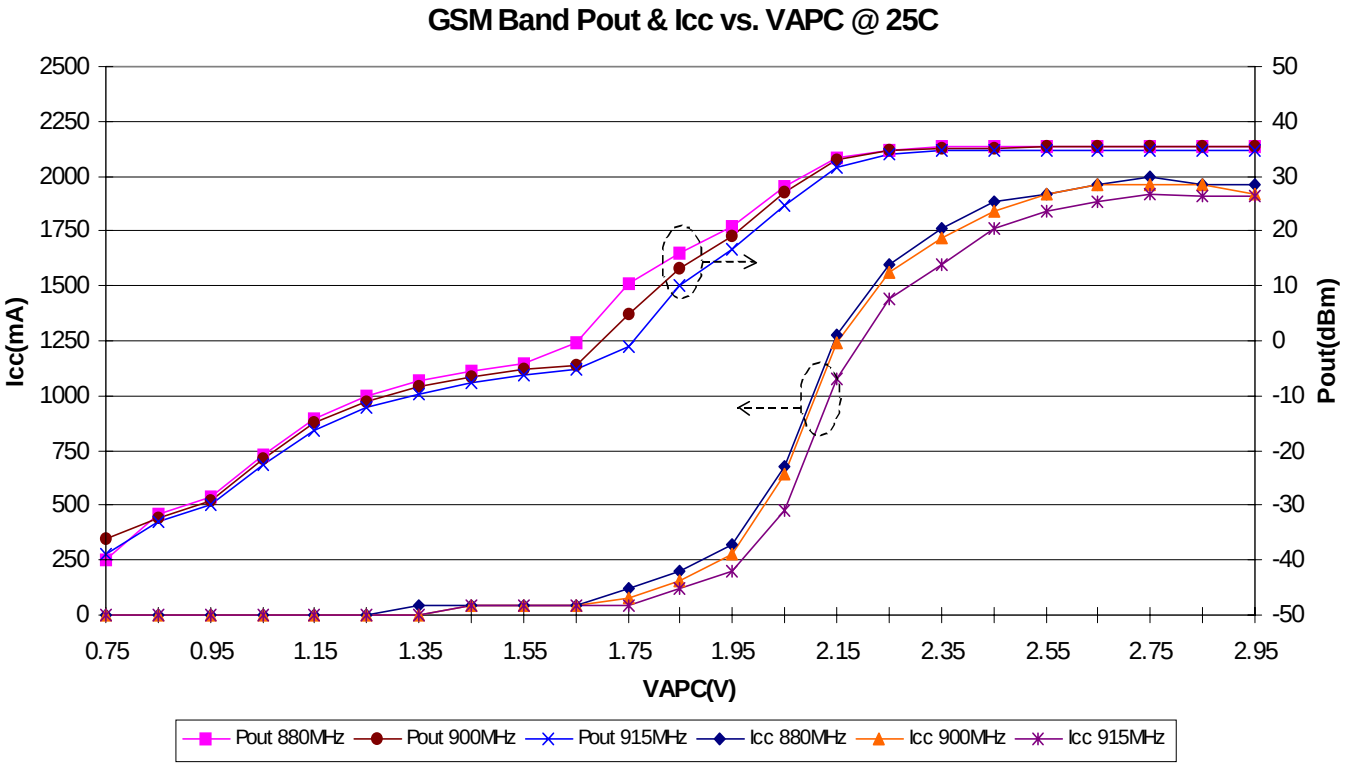


Figure 2

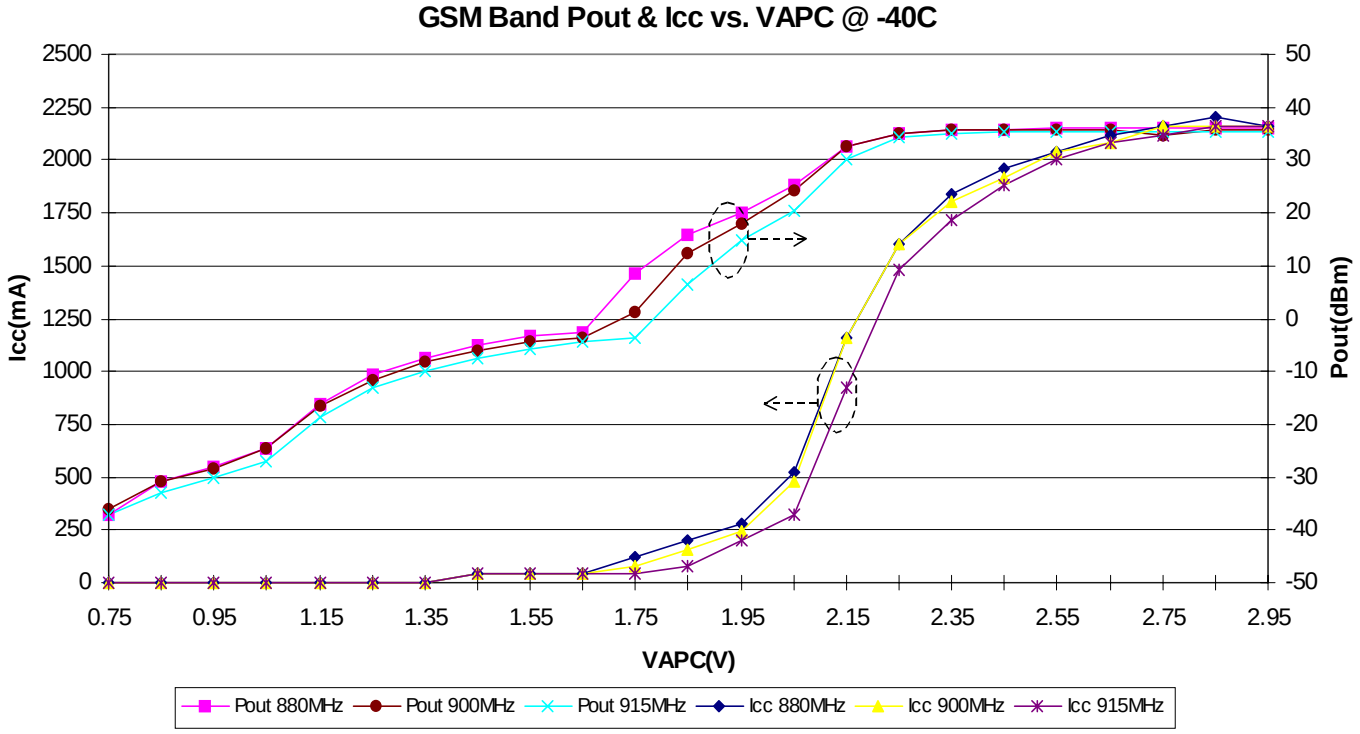


Figure 3

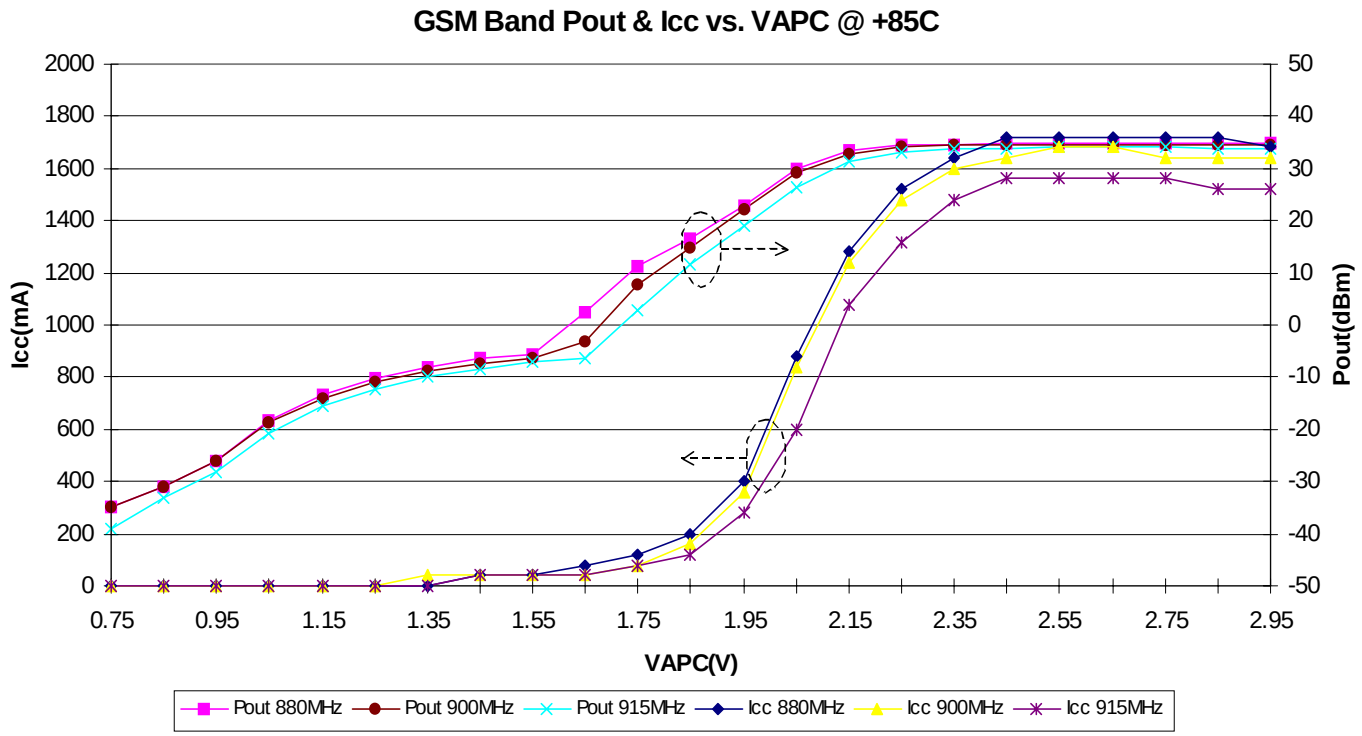


Figure 4

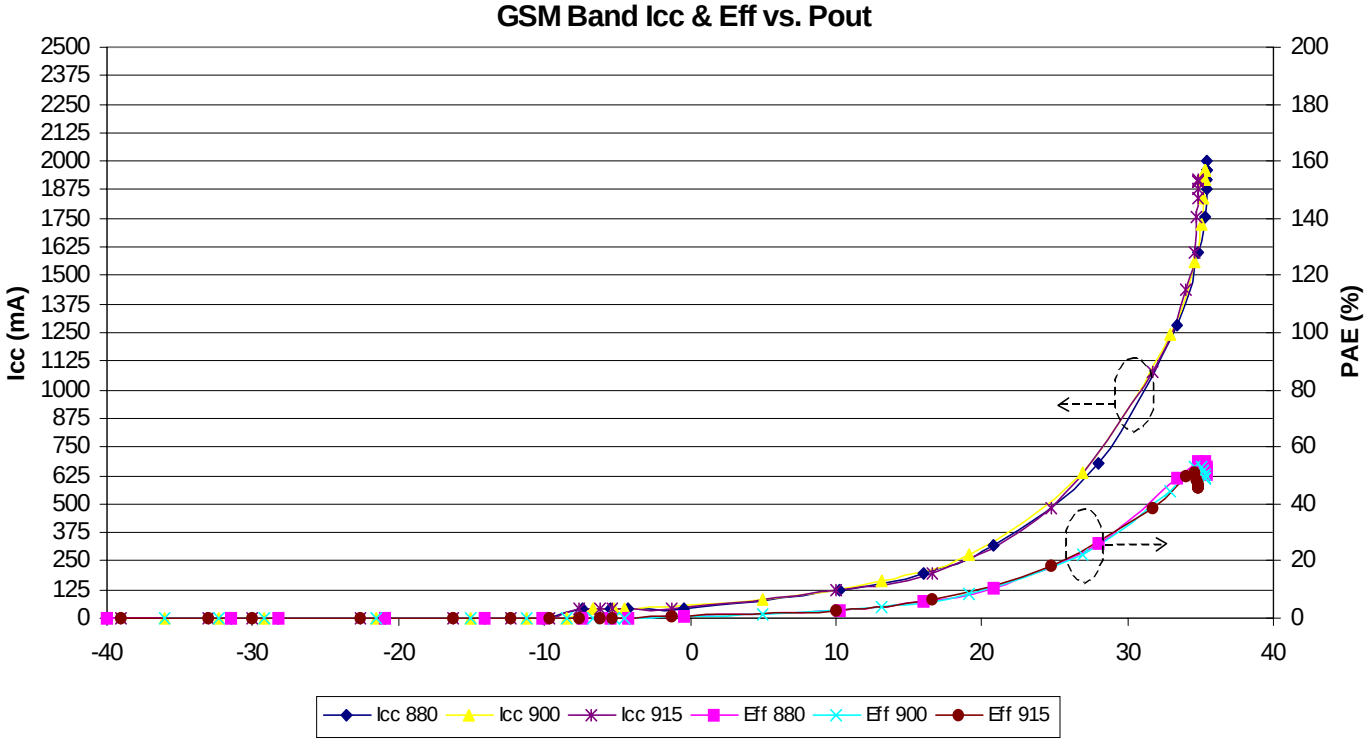


Figure 5

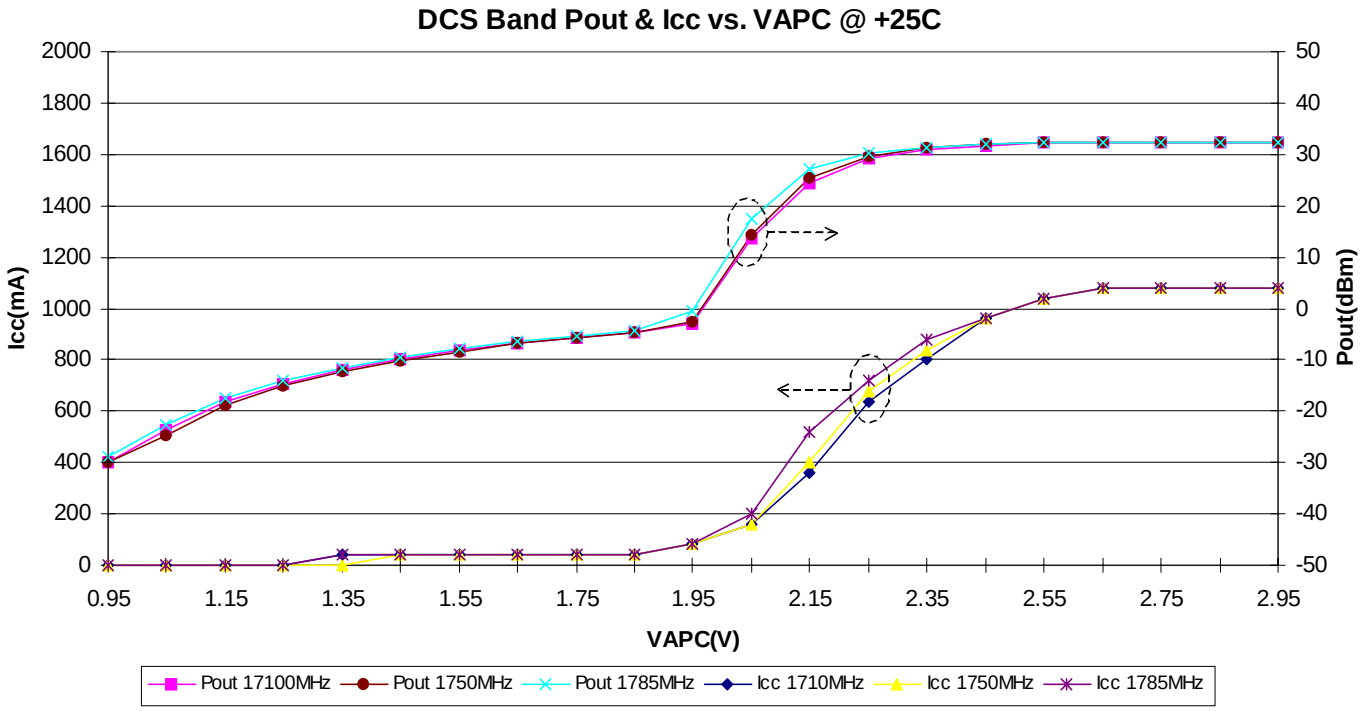


Figure 6

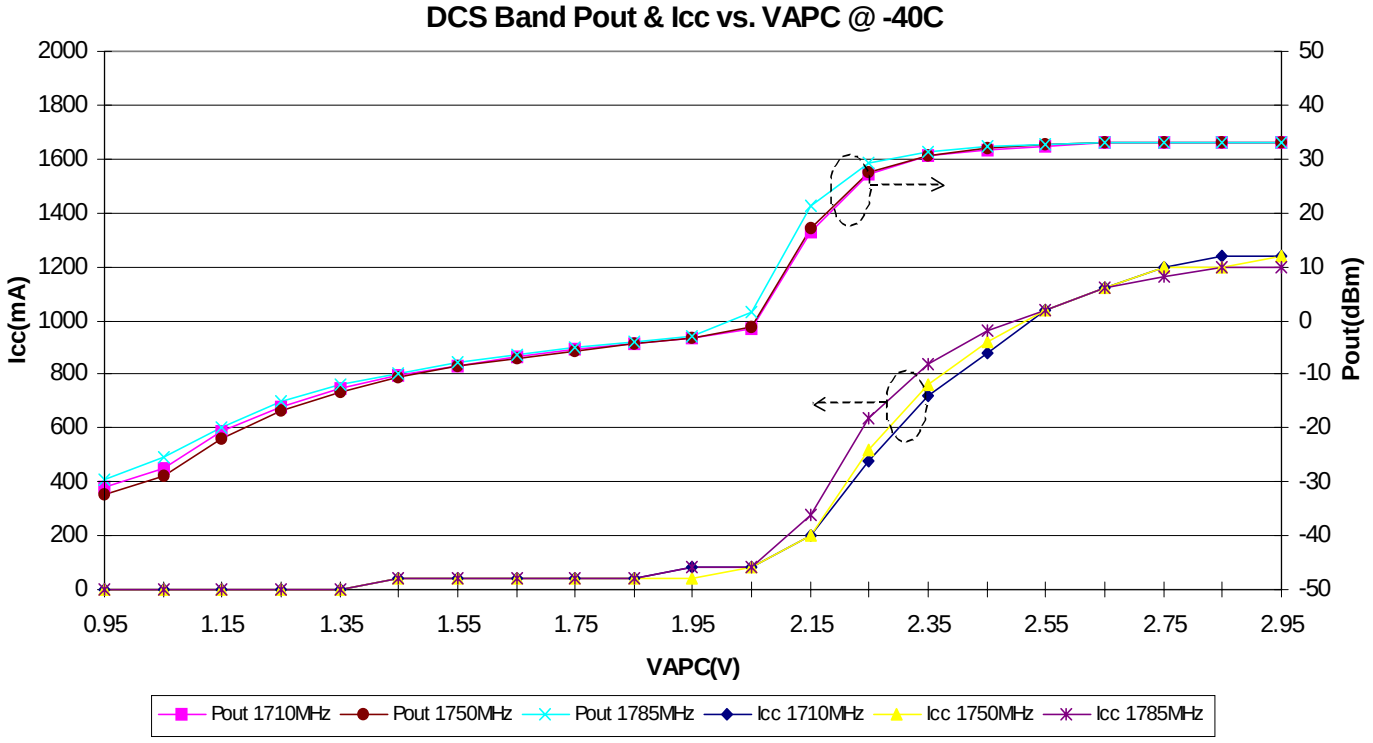


Figure 7

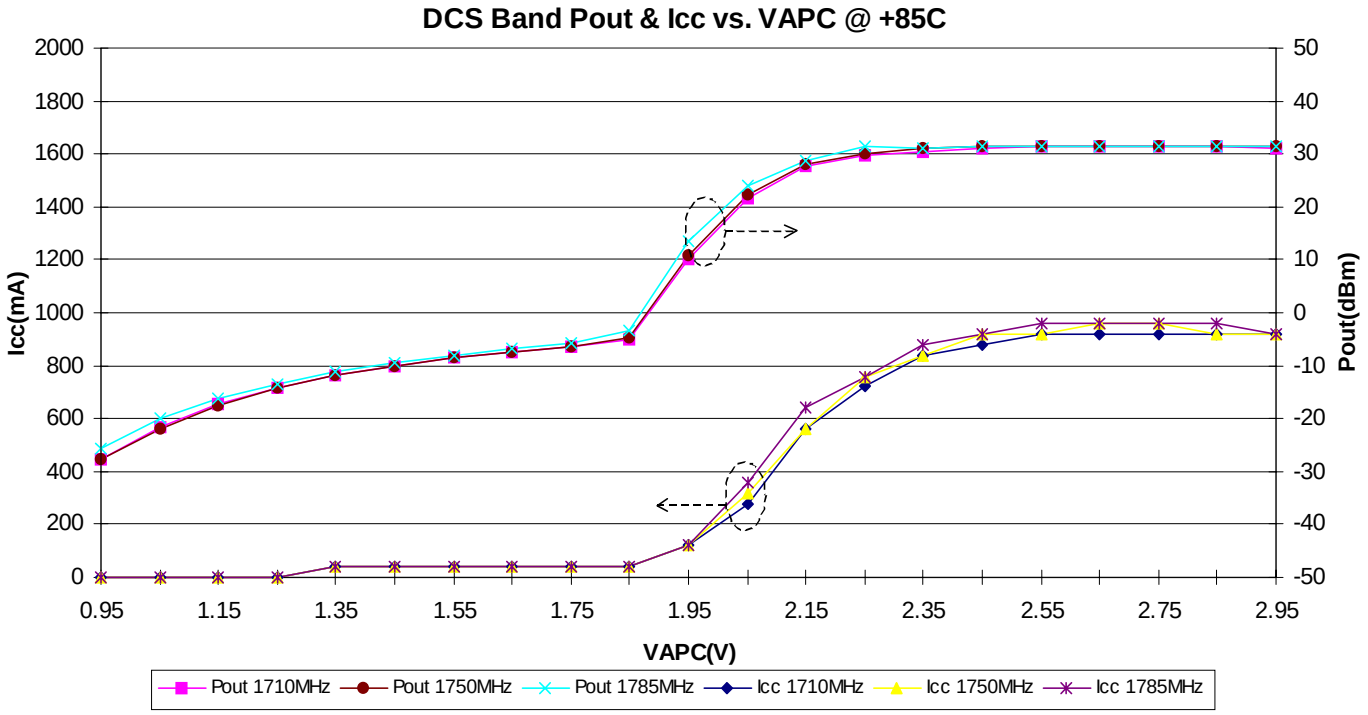


Figure 8

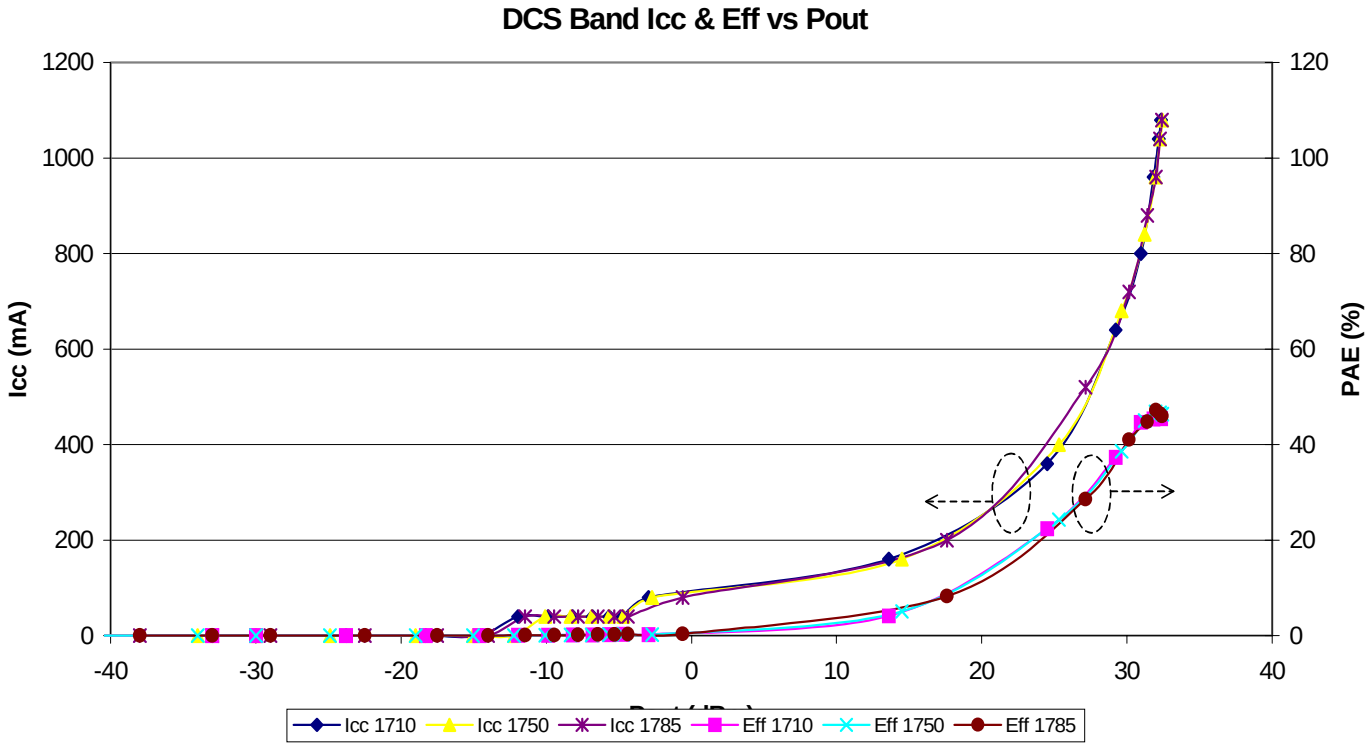


Figure 9

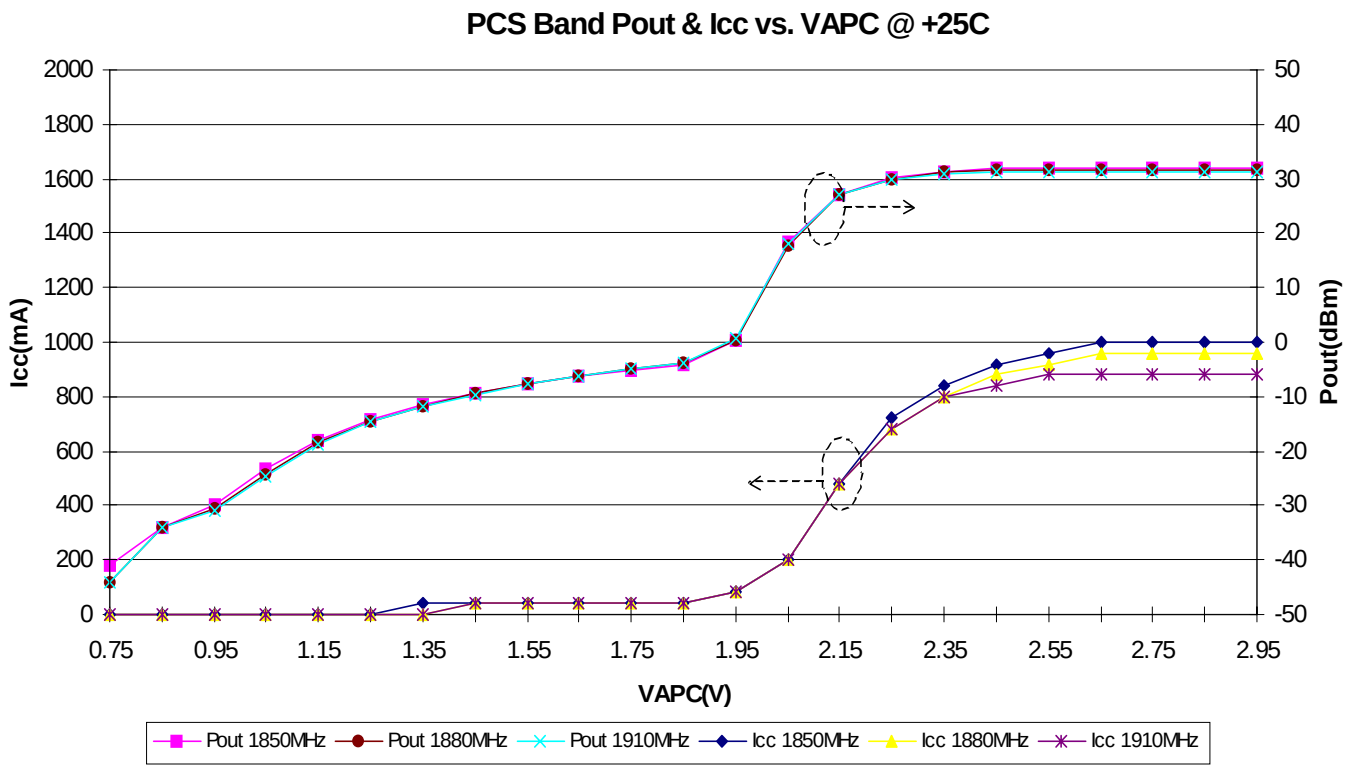


Figure 10

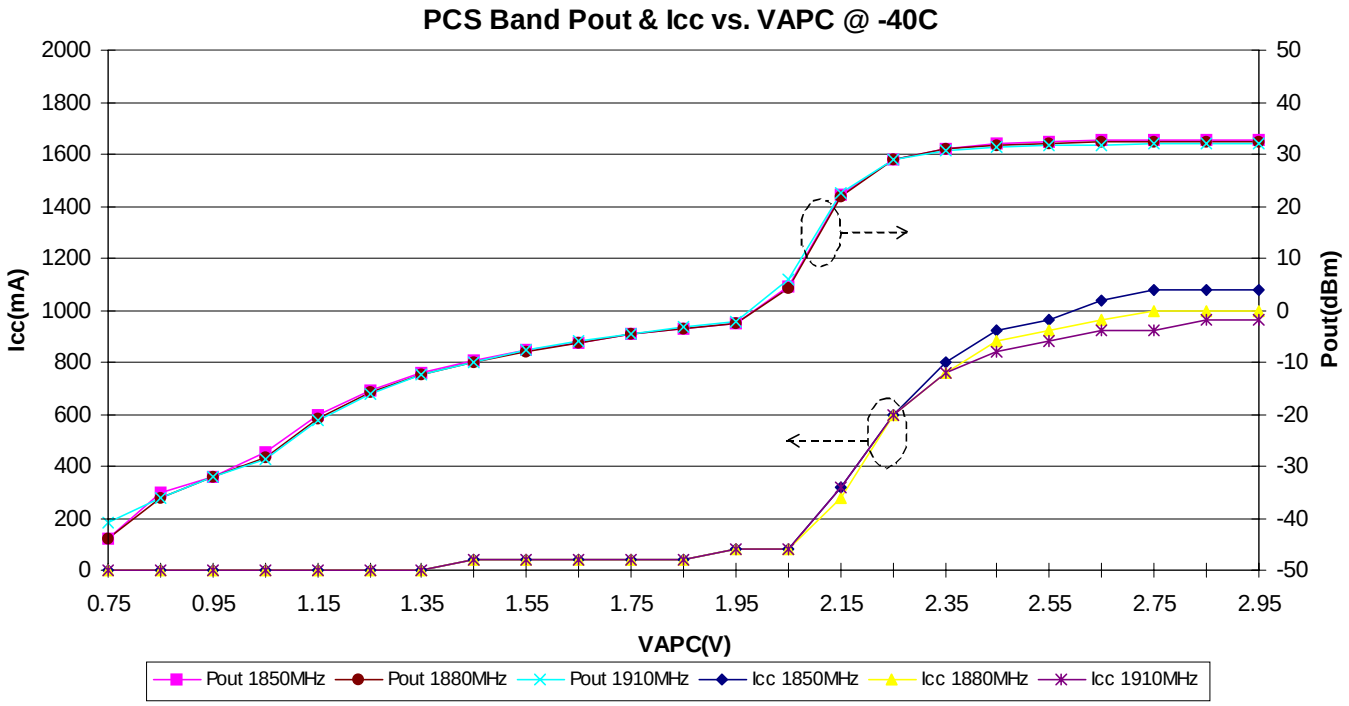


Figure 11

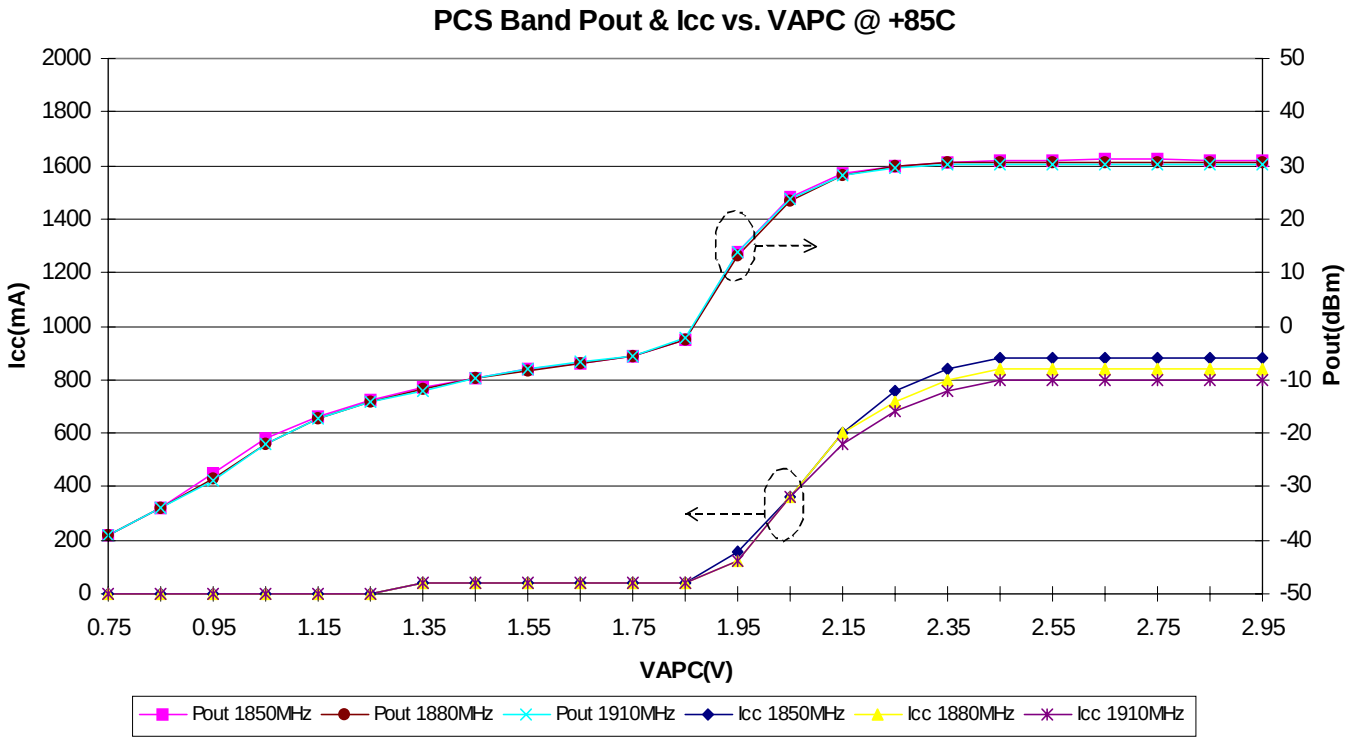


Figure 12

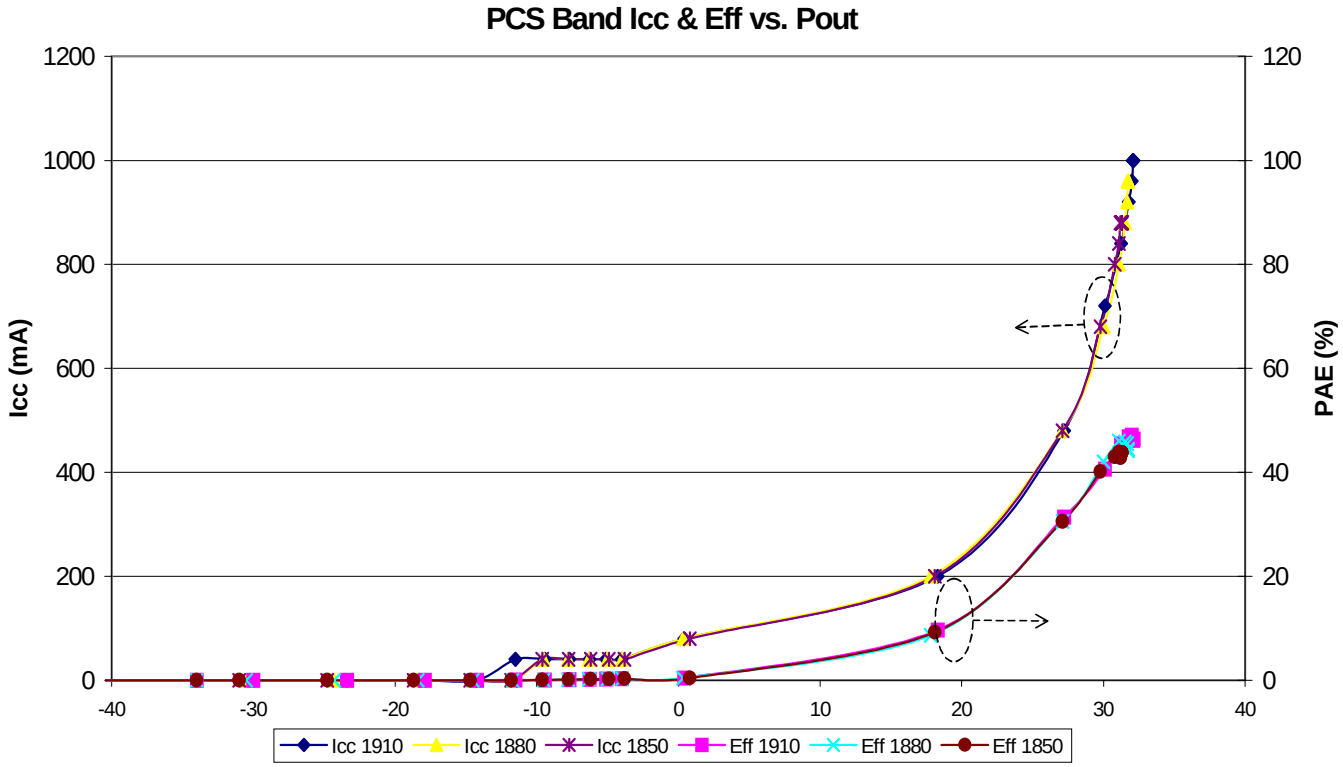


Figure 13

Pout vs. Class Operation

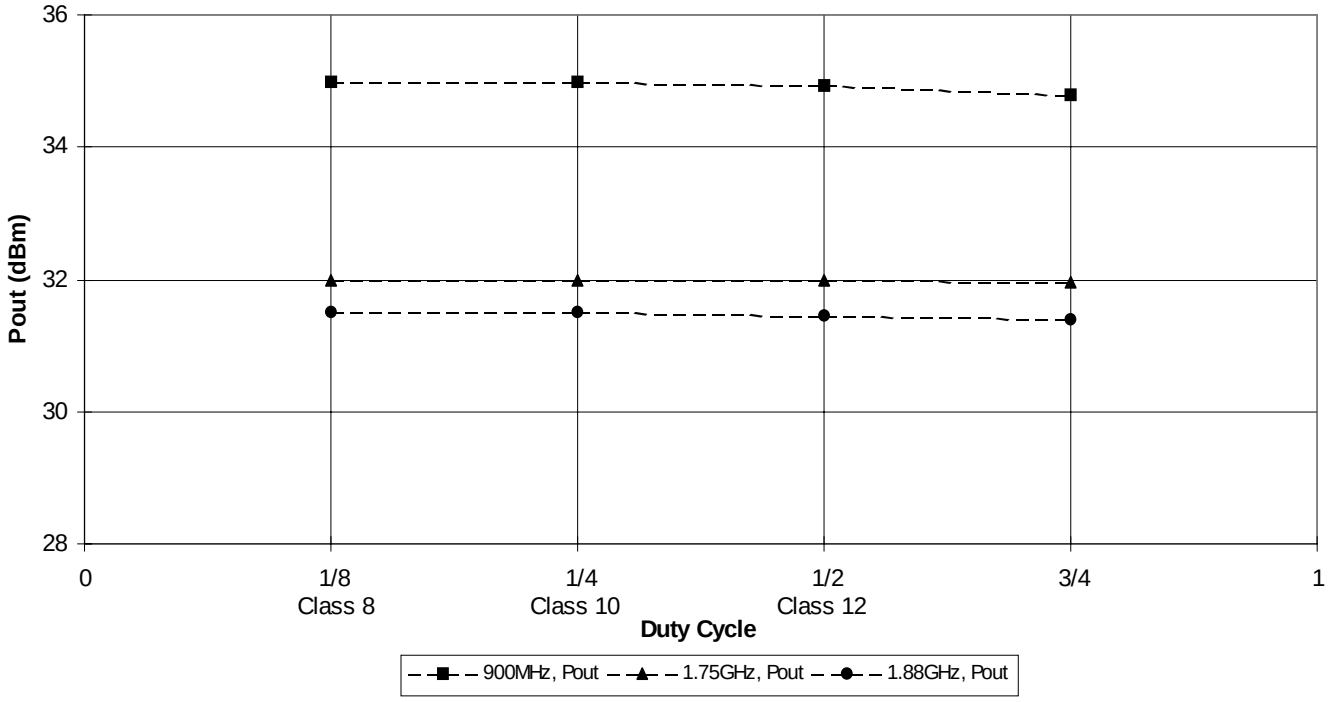
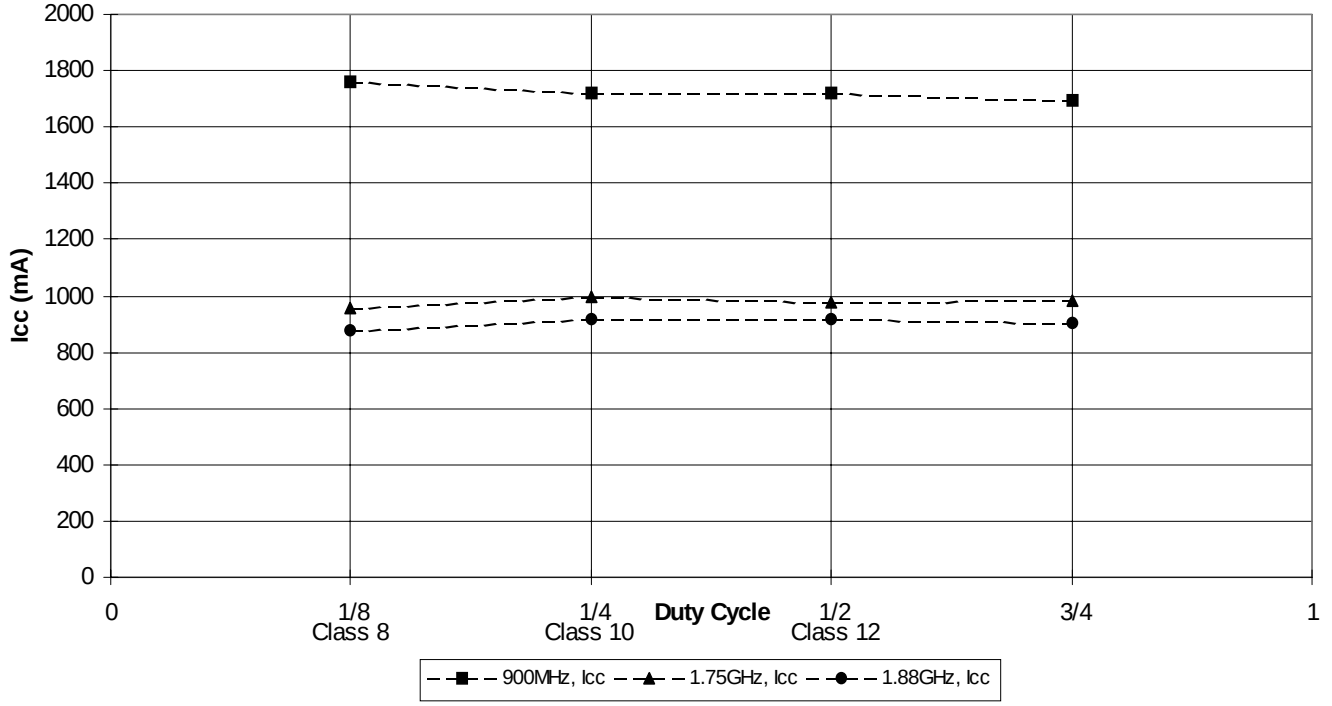


Figure 14

Icc vs. Class Operation



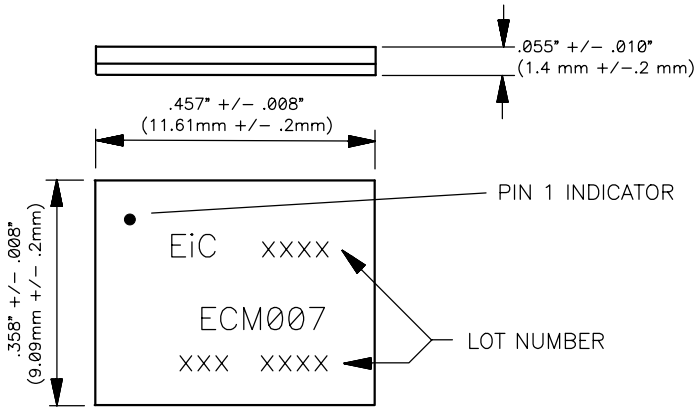
Pin Assignment Table

PIN	FUNCTION	DESCRIPTION
1	GND	Ground
2	DCS IN	RF input port to DCS PA (Requires dc block)
3	GND	Ground
4	EGSM IN	RF input port to EGSM PA (Requires dc block)
5	GND	Ground
6	Vcc	Vcc Power supply for PAs
7	GND	Ground
8	Vcc	Vcc Power supply for PAs
9	GND	Ground
10	EGSM OUT	RF output port EGSM PA
11	GND	Ground
12	DCS OUT	RFoutput port DCS PA
13	GND	Ground
14	Vapc	Analog power control
15	GND	Ground
16	BS	Band select
Center pad		RF ground and heat sink.
Notes:		All supply pins may be connected together at the supply.

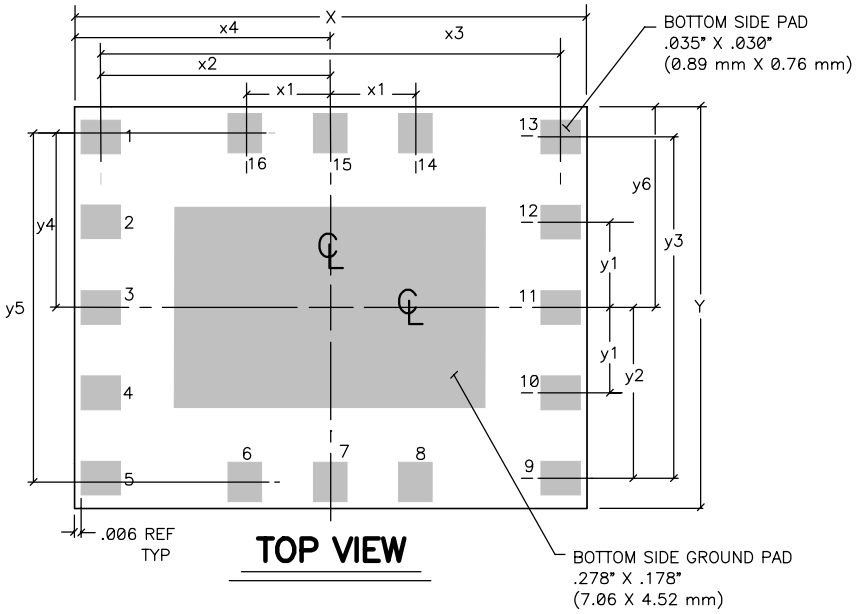
PACKAGE DIMENSIONS AND MARKINGS

The ECM007 is a laminate based, overmold encapsulated modular package designed for surface-mounted solder attachment to a printed circuit board.

Device Marking



PINOUT		PINOUT	
PIN	SIGNAL	PIN	SIGNAL
1	GND	9	GND
2	DCSin	10	GSMout
3	GND	11	GND
4	GSMin	12	DCSout
5	GND	13	GND
6	Vcc	14	Vapc
7	GND	15	GND
8	Vcc	16	Vbs



Package Dimensions

	Inches			Millimeters		
	min	nom	max	min	nom	max
X	.449	.457	.465	11.41	11.61	11.81
X1	.068	.076	.084	1.73	1.93	2.13
X2	.197	.205	.213	5.01	5.21	5.41
X3	.402	.410	.418	10.21	10.41	10.61
X4	.220	.228	.236	5.59	5.79	5.99
Y	.350	.358	.366	8.89	9.09	9.29
Y1	.068	.076	.084	1.73	1.93	2.13
Y2	.144	.152	.160	3.66	3.86	4.06
Y3	.296	.304	.312	7.52	7.72	7.92
Y4	.148	.156	.164	3.76	3.96	4.16
Y5	.304	.312	.320	7.72	7.92	8.12
Y6	.171	.179	.187	4.35	4.55	4.75

Metric values are converted from English values.
Metric values are rounded off.

APPLICATION NOTES

Please visit our website at www.eiccorp.com to view or download the following documents.
You may also call our Customer Service to request a hardcopy.

Document #	Description
AP-000513-000	TAPE & REEL SPECIFICATIONS: PAMS